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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

TUROCZY, DAVID P

ART UNIT	PAPER NUMBER
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1792

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/566,194	Applicant(s) RAS ET AL.	
	Examiner DAVID TUROCY	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 5-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 5-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, filed 11/18/2009, have been fully considered and reviewed by the examiner, however, the arguments are not deemed persuasive.

As for the arguments against Lombard, the examiner notes that the prior art discloses each and every process step as claimed, specifically mixing diamond particles with a boron powder and boric acid and heating for 4.5 hours at a temperature of 950°C in an inert atmosphere. Therefore, since the same steps are taken as claimed, the examiner maintains that some degree of coating will take place as required by the claims. In other words, the applicant and the prior art are performing the same process steps and therefore the results of the process steps must necessarily be the same unless the applicant is performing process steps that are not presently claimed. Additionally, the applicant argues that the prior art fails to disclose any boron coating, however, the examiner notes that diamond particles are mixed with the boron powder and heated to a temperature that the applicants evidenced as a coating process.

The applicant has argued against the ZA '995 reference, stating that the crux of the invention is the organometallic precursor and any coating not using the polymer or precursor would be against the teachings of the reference. The examiner disagrees. ZA '995 discloses that boron carbide coatings are known to be deposited onto abrasive particles and therefore modification of ZA '995 to deposit a boron carbide coating according to the teachings of Kim would have led to predictable results, i.e. a boron carbide coating on the abrasive particle. The applicant has failed to point to any disclosure in the reference that would rebut this position. The mere fact that the prior

art discloses another coating precursor doesn't foreclose the predictability of using alternative precursors to arrive at the same coating.

The applicant has argued against the Kim reference, stating that the reference discloses that boron source compound employed to form the coatings include evaporated boron and boric acid, but the reference is silent that the components can be combined to yield a suitable coating. The examiner disagrees. Absent evidence to the contrary, it is prima facie obvious to combine two components each of which is taught by the prior art to be useful for the same purpose, in order to form a this composition to be used for the very same purpose...[T]he idea of combining them flows logically from their having been individually taught in the prior art. *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069 1072.

The applicant has argued that ZA '995 is improperly modified by Kim because the modification goes against the crux of the ZA '995 reference. The examiner disagrees for the reasons set forth above.

The applicant has argued against the combination of Celikkaya with Kim and Ridgeway, arguing that the person ordinary skill in the art would not look to the secondary references to seek a better or alternative boron source for coating. The examiner notes that this is not supported by any factual evidence and merely a conclusory statement and therefore deemed moot. Additionally, a predictable use of prior art elements according to their established functions to achieve a predictable result is prima facie obvious. See *KSR Int'l Inc. v. Teleflex Inc.*, 127 S Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007).

Additionally, the examiner notes the Celikkaya does not limit the scope of the invention to the listed boron sources, but in fact discloses using any suitable boron source to form the coating as discloses. Therefore using alternative boron precursors, then those explicitly disclosed would have been obvious to one of ordinary skill in the art. However, Ridgway discloses known and suitable boron precursors include boric acid and boron oxide for forming a boron coating on an abrasive substrate (see entire reference) and Kim discloses elemental boron and boric acid are known vapor precursors (2796).

The applicant has argued that Ridgeway is silent to an abrasive with a boron coating, the examiner notes that the Ridgeway reference is supplied as a teaching that both boric acid and boron powder are known precursors to the formation of the boron carbide coating. Ridgeway discloses known and suitable boron precursors include boric acid and boron oxide for forming a boron coating on an abrasive substrate (i.e. the process of forming boron carbide will result in deposition of some boron carbide on itself, which is abrasive) (see entire reference). Celikkaya discloses boron powder (column 12, lines 35-45) and Celikkaya discloses using any boron source for forming the boron coating and a boron carbide coating (see column 12), and Ridgeway clearly discloses boric acid and boron powder are known boron sources for formation of boron carbide. Additionally, Kim discloses elemental boron and boric acid are known vapor precursors (2796). It appears as though the arguments directed at Ridgeway and Kim are directed at the references individually, rather than as applied in a combination, and therefore the arguments are deemed moot. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking

Art Unit: 1792

references individually where the rejections are based on combinations of references.

See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

All other applicant arguments that are not specifically addressed above are determined to be either not commensurate in scope with the claims or are mere attorney speculation that is unsupported by any factual evidence and therefore those arguments are deemed mot.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 7, 14, 15, 19 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 2356938 by Lombard, hereafter Lombard.

Lombard discloses a method for forming a coated grinding wheel, including mixing a diamond abrasive with boron powder and boric acid at a coating temperature of 950°C in a nitrogen (i.e. inert) atmosphere for a time sufficient to coat the diamond (see entire reference).

Claim 2: A grinding wheel is an abrasive tool.

Claim 7, and 19: These claims are rejected for the reasons set forth above.

Art Unit: 1792

Claim 14-15: Lombard discloses 4.5 hours of heating (page 3, Left column, lines 65-66).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5-6, 8-9, 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 2356938 by Lombard, hereafter Lombard.

Claim 5-6: The reference fails to disclose the appropriate composition, however, it is the examiners position that the composition of the source material is a result effective variable: directly affecting the quality of the film deposition and the resulting deposited film. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to determine the appropriate amount of each source, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 8-9: Lombard fails to disclose the temperature as claimed, however the selection of the appropriate temperature for the coating process is well within the skill of one of ordinary skill in the art at the time of the invention to lead to predictable results.

Art Unit: 1792

Additionally, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to determine the appropriate temperature, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 105 USPQ 223 (CCPA 1955).

Claims 8, 9 and 16: The coating time and temperature are a known result effective variable, directly effecting the coating characteristics and therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the time and temperature used in the process of, through routine experimentation, to deposit the desired boron film with the desired properties associated with the boron coating process.

Claims 17-18: Lombard does not discloses the range of boron source to abrasive, however, the ratio of coating material to the substrate is a result effective variable. If the ratio is too low, the substrate is insufficiently or improper coated and too high results in thicker or improper coating. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have determined the appropriate amount of boron source, relative to the amount of substrate, through routine experimentation to effectively and efficiently coat the substrate with the desired amount of coating.

5. Claims 1, 2, 5-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over ZA 20017995, hereafter ZA '995 in view of Chemical Vapor deposition of boron and boron nitride from decaborane by Kim et al., hereafter Kim.

Claim 1: ZA '995 discloses a process for producing a boron coated abrasive, the process including the steps of contacting the abrasive to be coated with a boron source, at a coating temperature of about 800.degree. C. to about 1200.degree. C. in an inert atmosphere, for a time sufficient to coat at least a portion of the abrasive (for examples abstract, Page 5-6). ZA'995 discloses boron powder (page 5) ZA '995 discloses coating the abrasive with a boron carbide coating, but fails to disclose the boron powder/boric acid composition. However, Kim discloses known and suitable boron sources for deposition of boron coatings include elemental boron and boric acid (see page 2796) and therefore it would have been obvious to have modified ZA '995 to include boric acid with the disclosed boron powder will provide predictable results of providing a boron source for the deposition of a boron film.

Claim 2: ZA '995 discloses the abrasive is in the form of abrasive particles, larger abrasive bodies, or abrasive tools (page 5).

Claims 5-6: The combination of references fails to disclose the appropriate composition, however, it is the examiners position that the composition of the source material is a result effective variable: directly affecting the quality of the film deposition and the resulting deposited film. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to determine the appropriate amount of each source, since it has been held that discovering an optimum

Art Unit: 1792

value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 7-8: These claims are taught by ZA '995 at page 6, see 1000°C as the process temperature, which the examiner maintains is about 1100°C as required by claims 8.

Claims 7-16: The examiner maintains the position as discussed above with regards to the temperature, additionally, ZA '995 discloses the preheating steps, the heating rates, and the final temperature are all result effective variable that directly effect the coating process (page 6) and therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the process as taught by ZA '995 to optimize the result effective variables, in this case the particular heating steps and rates, using routine experimentation to reap the benefits of the proper film deposition.

Specifically to Claim 10-14: Specifically, ZA '995 discloses preheating to a temperature of 300°C at a rate of 10°C/min, but fails to disclose maintaining at the temperature for 15 to 45 minutes, however, the reference discloses heating slowly thereafter at 10°C/hr and it is the examiners position that it would have been obvious to maintain the temperature for a time period within the range as claimed with a reasonable expectation of predictable results. Additionally, the examiner maintains the claims include about language and the examiner maintains 300-310°C over an hour period is "about" 300°C, within the range as claimed.

Specifically to Claims 14-16: ZA '995 discloses the final temperature at a time sufficient to deposit the film, discloses a about 4 hours, however, discloses the time is

Art Unit: 1792

a result effective variable and optimizing the time through routine experimentation would have been obvious to one of ordinary skill in the art to deposit an appropriate film.

Claim 14: ZA '995 discloses the abrasive and boron source are heated at the coating temperature for at least 30 minutes (Page 6).

Claim 15: ZA '995 discloses the abrasive and boron source are heated at the coating temperature for at least 3 hours (page 6).

Claims 17-18: ZA '995 does not discloses the range of boron source to abrasive, however, the ratio of coating material to the substrate is a result effective variable. If the ratio is too low, the substrate is insufficiently or improper coated and too high results in thicker or improper coating. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have determined the appropriate amount of boron source, relative to the amount of substrate, through routine experimentation to effectively and efficiently coat the substrate with the desired amount of coating.

Claim 19: ZA '995 discloses the abrasive is diamond or cubic boron nitride (page 4).

6. Claims 1-2, 5-9, and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Celikkaya in view of US Patent 1897214 by Ridgway and Kim.

Claim 1: Celikkaya discloses a process for producing a boron coated abrasive, the process including the steps of contacting the abrasive to be coated with a boron source, at a coating temperature of about 800.degree. C. to about 1200.degree. C. in

Art Unit: 1792

an inert atmosphere, for a time sufficient to coat at least a portion of the abrasive (for examples Column 12-14). Celikkaya discloses boron powder (column 12, lines 35-45) and Celikkaya discloses using any boron source for forming the boron coating and a boron carbide coating ((see column 12), however, the reference fails to disclose boric acid in combination with boron powder. However, Ridgway discloses known and suitable boron precursors include boric acid and boron oxide for forming a boron coating on an abrasive substrate (see entire reference) and Kim discloses elemental boron and boric acid are known vapor precursors (2796). Therefore, taking the references collectively it would have been obvious to one of ordinary skill in the art to have modified Celikkaya to include boric acid with the boron powder with a reasonable expectation of successful results of providing a boron coating because Ridgway and Kim discloses boric acid is a known vapor source for boron comprising films and thus one would expect success in combining boron powder and boric acid.

Claim 2: Celikkaya discloses the abrasive is in the form of abrasive particles, larger abrasive bodies, or abrasive tools (examples).

Claims 5-6: The combination of references fails to disclose the appropriate composition, however, it is the examiners position that the composition of the source material is a result effective variable: directly affecting the quality of the film deposition and the resulting deposited film. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to determine the appropriate amount of each source, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 7-9: These claims are taught by Celikkaya at column 13, lines 35-40, as the process temperature, which the examiner maintains is about 1150°C as required by claims 9.

Claims 14-16: Celikkaya discloses about 6 hours, which the examiner maintains reads on at least 6 hours. The term "about" render the prior art inclusive of certain degree of times longer than 6 hours (Column 13, lines 25-35).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent 6524357 discloses the deposition temperature and ramp rate are known to require strict control due to the substrate (Column 7, 10).

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID TUROCY whose telephone number is (571)272-

Art Unit: 1792

2940. The examiner can normally be reached on Monday, Wednesday and Friday from 7 a.m. - 6 p.m., Tuesday and Thursdays 7-10 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David Turocy/
Primary Examiner, Art Unit 1792